The Impact of Labour Market Policies on Productivity in OECD Countries

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ABSTRACT

We investigate the impact of labour market policies on labour and multifactor productivity with industry-level data. First and foremost, labour market policies can influence average measured productivity through their impact on employment. Other things equal, employment growth tends to be associated with lower average measured labour productivity growth as more low-skilled workers enter the workforce. However, policies can also have sizeable direct effects on individual productivity levels and/or growth by creating incentives for workers to invest in training, facilitating reallocation of resources to their most productive uses and generating or maintaining high-quality job matches. We find that employment protection legislation, minimum wages, parental leave and unemployment benefits influence productivity through multiple channels, over and above their impact on employment levels.

GROWTH IN GDP PER CAPITA, one of the primary economic policy objectives of OECD countries, can be decomposed into the growth of two components: labour utilisation and labour productivity.[2] During the 1990s, labour productivity growth accounted for at least half of GDP per capita growth in most OECD countries, and a considerably higher proportion in many of them (OECD, 2003). Population ageing in many OECD countries means that continued productivity growth, along with increased labour force participation among currently underrepresented groups, will be crucial to improve living standards in the future.

The impact of labour market policies on labour utilisation is well-documented (see OECD, 2006, for a summary). However, some have argued that certain labour market reforms

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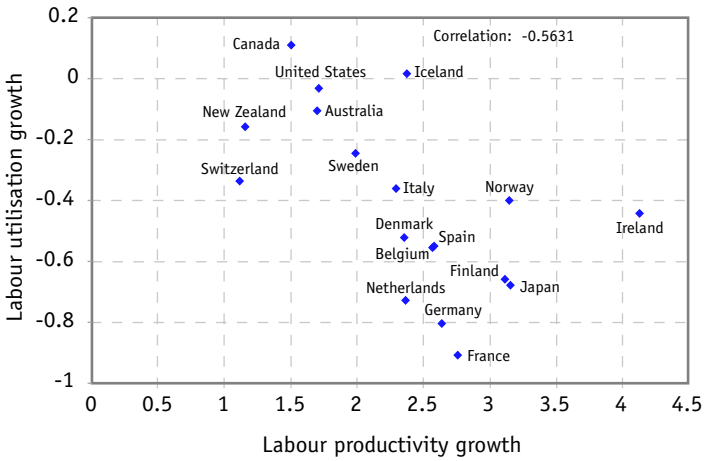
2 Labour utilisation is defined as total hours worked divided by total population. Growth of labour utilisation can result from an increase in the employment rate, an increase in average hours worked by the employed population and/or an increase in the share of the working age population in the total population.

Chart 1
Labour Utilisation Growth and Labour Productivity Growth in OECD Countries, 1970-2005
(average annual growth rates in percentage)



Note: Labour utilisation growth is measured as growth of total hours worked divided by total population. Labour productivity growth is measured as growth of GDP per hour worked.

Source: OECD Productivity database.

that increase labour utilisation may at the same time reduce productivity growth and have a negative long-run impact on living standards, at least as measured by GDP per capita (Heckman, Ljunge and Ragan, 2006). We try to shed some light on this issue by examining the impact of various labour market policies on productivity levels and growth rates. Key channels through which labour market policies affect productivity are identified and assessed empirically.

At an aggregate level, the growth of labour utilisation tends to be associated with lower average measured labour productivity growth. Chart 1 shows that there is a negative correlation between the growth rates of labour utilisation and measured average labour productivity between 1970 and 2005. This phenomenon, referred to herein as a *composition effect*, has several explanations. First, it arises, in part, because conventional measures of labour productivity do not adequately control for changes in the quality of labour. Aggregate employment growth is usually associated with faster employment growth for the poorly-educated than for the highly-educated, so reduces the average level of skills and productivity among the employed (see e.g. Nickell and Bell, 1996; Belorgey, Lecat and Maury, 2006). Thus, an increase in employment with no change in the average productivity per unit of skilled labour and/or individual productivity for those already in employment would lead to a reduction in average measured labour productivity. Second, if employment increases as a result of greater labour supply, labour-intensive (often low-productivity) activities are likely to expand. While the productivity of individual firms or industries could remain unchanged, an expansion of low-productivity production will depress aggregate productivity levels (McGuckin and van Ark, 2004; Dew-Becker and Gordon, 2006). Finally, other things being equal, diminishing returns to labour inputs imply that the marginal impact of higher employment rates (or longer hours of work per worker) on output will be smaller (see e.g. Bourles and Cette, 2005).

In other words, if no other link existed between labour market reforms and productivity, a reform that increased employment would have a less-than-proportionate impact on GDP per capita because of its dampening effect on average measured labour productivity, even with no reduction in the output of workers already in employment prior to the reform. But any slowdown in average measured productivity resulting directly from a change in employment would be, to a large extent, a *statistical artefact* and would not imply a fall in individual productivity. An example is a reduction in the generosity of unemployment benefits, examined later in this article, which encourages more low productivity workers into work, but does not necessarily alter the productivity of existing workers. The implications of such a reform for policy evaluation, therefore, depend on the relative importance placed by soci-

ety on employment and productivity. Indeed, if society welcomes employment growth as a positive development as the disadvantaged become integrated into society, any accompanying slowdown in measured productivity growth due only to increased employment could be considered a sign of progress. In this sense, productivity growth may be a misleading indicator of whether society is better off.

Pro-employment policy reforms, however, can also directly affect productivity through a number of channels. First, policies that influence incentives for workers or firms to invest in training or education can affect productivity by altering the stock of human capital. Second, policies that encourage the movement of resources between declining and emerging firms, industries or activities can enhance productivity by helping firms respond quickly to changes in technology or product demand. Third, policies that improve the quality of job matches or maintain high-quality job matches for longer can increase the effectiveness of labour resource allocation, increasing the level of productivity. Fourth, policies that make labour more expensive relative to capital can affect the direction and pace of technological change. Finally, policies that reduce social conflict can condition workers' effort and their willingness to align their behaviours with their employer's objectives. Employment-enhancing policies can also have an indirect impact on aggregate productivity by reducing spending on social support and making room for more public or private spending on education, research and development or other productivity-enhancing activities.

From a policy perspective, it is important to be able to estimate both the independent impact of labour market policies on productivity and, whenever productivity effects due to changes in employment (composition effects) are likely to be large, the overall impact on GDP per capita. This article examines the productivity effects of four specific labour market policies (employment protection legislation (EPL), minimum wages, unemployment benefits, and parental leave) using, in most cases, an approach that takes advantage of the fact that labour market policies are more binding in some industries than others and that within-industry composition effects are likely to be relatively small.

The remainder of the article is structured as follows. The next section briefly outlines the method used to estimate the impact of labour market policies on productivity. The following sections examine the existing evidence and present new estimates on the impact of the four policies on productivity growth and/or levels. A brief conclusion follows.

Exploiting Industry-level Differences in the Impact of Policies on Productivity

As discussed above, labour market policies may exert conflicting effects on average measured productivity through composition effects due to their influence on aggregate employment levels and direct effects on productivity or economic efficiency. Composition effects have been shown to be substantial at an aggregate level, however OECD (2007a) shows that within-industry composition effects are likely to be small.[3] This implies that

3 OECD (2007a) estimates that the apparent elasticity of aggregate labour productivity to hours-adjusted employment rates (total hours per person of working age) is in the range of -0.4 to -0.9, which is in line with estimates found in other studies (Bourles and Cette, 2005, 2007; Dew-Becker and Gordon, 2006; Gust and Marquez, 2004). The magnitude of the estimates implies that if the composition effect was the only channel linking labour market policies to productivity, a policy reform that increases total hours per capita by 1 per cent would reduce labour productivity by 0.4 per cent to 0.9 per cent and result in an overall increase in GDP per capita of only 0.1 per cent to 0.6 per cent. In industry-level estimates based solely on within-industry variation, this apparent elasticity slumps to about -0.1 only and even becomes positive when potential endogeneity is taken into account.

industry-level analysis can meaningfully shed light on the impact of selected polices on productivity, over and above any statistical/accounting effect brought about by changes in employment.

Most of the estimates presented in this article use a differences-in-differences estimation technique, which is based on the assumption that the policies examined influence worker or firm behaviour more in some industries (referred to herein as *policy-binding industries*) than others. For example, if stringent EPL reduces productivity by making it more difficult for resources to flow to high productivity activities, reforms to EPL are likely to have a greater impact on productivity in industries where, in the absence of regulations, firms would rely on laying off workers to make changes to staffing levels and organisation, rather than in industries where internal labour markets or voluntary turnover are more important. Likewise, changes in minimum wages or parental leave policies are likely to have a greater impact in industries where employment tends to be dominated by low-wage workers or women, respectively.

We use aggregate cross-country data on labour market policies from a variety of OECD datasets, matched with industry-level data on productivity and capital stock, drawn from the OECD STAN and the GGDC 60-industry databases, for a sample of 18 countries: Canada, Japan, Norway, the United States and pre-enlargement EU countries except Luxembourg (the analysis of minimum wages uses a subset of 11 countries with a statutory minimum wage). The time period covered by the analysis covers the period 1979-2003 (the analysis of EPL covers 1982-2003 due to data availability). The sample covers the ten manufacturing industries (STAN 2-digit breakdown), plus utilities, construction, trade, hotels and restaurants, transport and communications, and finance industries. Data for other industries are excluded either because they include sizeable public sector employment or because it is difficult to measure their productivity accurately. Bassanini and Venn (2007) outline the estimation methods and data sources used in the estimates in this article in more detail.

Employment Protection Legislation

EPL, the set of regulations governing the hiring and firing of workers, could affect production efficiency and productivity growth through several channels. Strict EPL may increase productivity by acting as a signalling device to workers about firm commitment, increasing worker effort and incentives to invest in firm-specific human capital and to cooperate with the implementation of productivity-enhancing work practices or new technologies (Soskice, 1997; Belot *et al.*, 2002) or spur productivity-enhancing investments by incumbent firms in order to avoid downsizing (Koeniger, 2005). Alternatively, by increasing the cost of firing workers, strict EPL could make firms reluctant to hire new workers, impeding flexibility and slowing the flow of labour resources into emerging high-productivity firms, activities or industries (Hopenhayn and Rogerson, 1993; Saint-Paul, 1997, 2002). Stringent EPL also discourages firms from experimenting with new technologies, characterised by potentially higher returns but also greater risk (Bartelsman *et al.*, 2004) and potentially reduces effort (thus productivity) because there is a lower threat of layoff in response to poor work performance or absenteeism (Ichino and Riphahn, 2001).

The existing cross-country evidence on the relationship between EPL and productivity growth is inconclusive. Using aggregate, cross-country analysis DeFreitas and Marshall (1998) find that strict EPL has a negative impact on labour productivity growth while Nickell and Layard (1999) and Koeniger (2005) find a weak positive relationship between EPL strictness and both MFP and

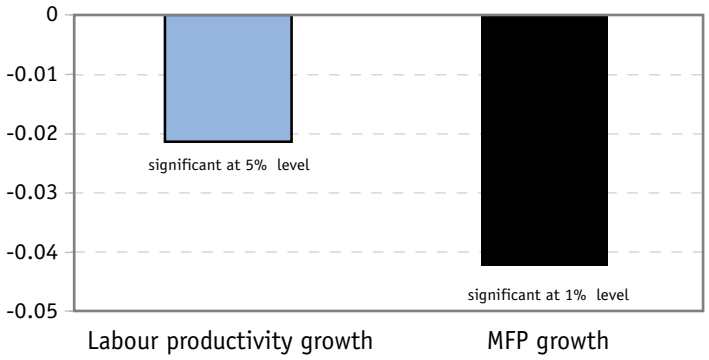
labour productivity growth.[4] Autor *et al.* (2007) find that restrictions to the employment-at-will doctrine in US states have a positive effect on capital deepening, a negative effect on MFP and no effect on labour productivity. Using an estimation technique similar to that used in this article but for a sample of only 11 OECD countries and a narrower industry coverage, Bassanini, Nunziata and Venn (2008) find a negative relationship between layoff costs and MFP growth adjusted by changes in labour and capital composition. There is also some support for the argument that EPL slows the speed at which job matches are destroyed in declining industries and created in expanding industries (e.g. Burgess *et al.*, 2000; Boeri and Jimeno, 2005; Micco and Pages, 2006; Haltiwanger *et al.*, 2006; Messina and Vallanti, 2007).

We estimate the impact of EPL for regular contracts using a cardinal index of the stringency of EPL which varies from 0 (least stringent) to 6 (most stringent). We assume that the effect of EPL on productivity is stronger in industries with greater underlying layoff propensity, identified based on layoff rates by industry in the United States, the least regulated country in the sample. Chart 2 shows that EPL on regular contracts has a small but statistically significant negative effect on aggregate productivity growth. A one-point increase in the index of EPL stringency – roughly corresponding to half of the difference between the OECD average and the country with the lowest value of the EPL index (United States) – appears to reduce the annual growth rate of labour productivity by at least 0.02 percentage points and the annual growth rate of MFP by at least 0.04 percentage points.[5] The fact that EPL appears to have a stronger effect on MFP growth than labour productivity growth might reflect a positive impact on capital deepening. Although the estimated effect of EPL on productivity is small, it is not negligible from a policy perspective, since it cumulates over time. For instance, if in the mid-1980s Portugal (the country in the sample with the highest value of the EPL index) had liberalised provisions for regular contracts to reflect those of the United States, its labour productivity would be more than 1.5 percentage

Chart 2

Impact of Employment Protection Legislation (EPL) on Productivity Growth

Percentage-point impact on labour productivity growth and MFP growth of a one-point increase in the EPL index for regular contracts



Note: Derived from difference-in-differences OLS estimates. The estimates in this chart are calculated by multiplying the estimated effect of EPL in EPL-binding industries by the share of EPL-binding industries in total GDP. This assumes that there is zero impact of EPL in other industries (and in all industries that are not included in the sample used in the analysis). Therefore, the estimates represent a lower bound of the aggregate impact of EPL on productivity growth. See Bassanini and Venn (2007) for full methodology and results.

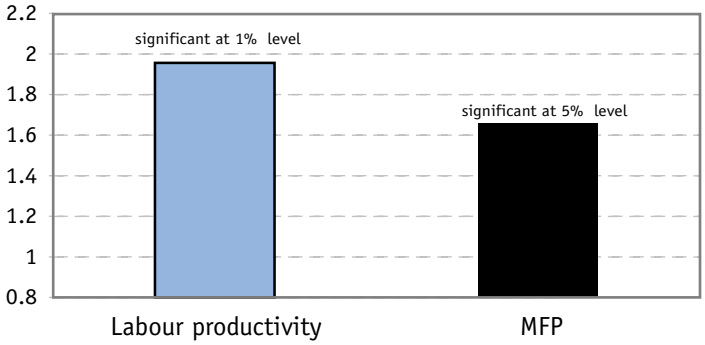
4 In Nickell and Layard (1999), the relationship between labour productivity and EPL is not statistically significant once the productivity gap with the United States is included in regressions, but the relationship between MFP growth and EPL continues to hold.

5 The estimated effect on MFP growth is smaller than that measured by Bassanini, Nunziata and Venn (2008). Two main reasons are likely to account for this discrepancy. First, they use a more sophisticated measure of MFP, which controls for labour composition and capital quality. Second, and perhaps more important, they use a semi-structural Schumpeterian growth model estimated in first differences. The latter is not replicated here insofar as it is more data demanding and would lead to excessively small country coverage in the case of the analysis of the productivity impact of statutory minimum wages (see next section).

Chart 3

Impact of Minimum Wages on Productivity

Percentage-point impact on labour productivity and MFP levels of a ten percentage-point increase in the ratio of the minimum wage to the median wage



Note: Derived from difference-in-differences OLS estimates. The estimates in this chart are calculated by multiplying the estimated effect of the minimum wage in low-wage industries by the share of low-wage industries in total GDP. This assumes that there is zero impact of the minimum wage in other industries (and in all industries that are not included in the sample used in the analysis). Therefore, the estimates represent a lower bound of the aggregate impact of the minimum wage on productivity levels. See Bassanini and Venn (2007) for full methodology and results.

points higher than is presently the case. The effect on MFP would be even greater.

Minimum Wages

High minimum wages can reduce demand for unskilled labour, relative to skilled labour, thereby leading to substitution of skilled for unskilled workers and increasing production without any overall change in the employment level (Neumark and Wascher, 2006; Aaronson and French, 2007). If more skilled labour is employed and more unskilled labour is excluded from employment, the aggregate skill level of the workforce will increase, thereby raising average measured productivity. Minimum wages also compress the lower tail of the wage distribution without necessarily affecting individual productivity, thereby increasing employers' incentive to pay for training as they can reap the difference between productivity and wage growth after training (see e.g. Acemoglu and Pischke, 1999 and 2003). Moreover, low-skilled workers could have a greater incentive to invest in human capital to avoid unemployment (Cahuc and Michel, 1996; Agell and Lommerud, 1997; Agell, 1999). On the other hand, by compressing wage relatives between skilled and unskilled jobs, minimum wages could reduce incentives for the low-skilled to invest in training. More importantly, high minimum wages prevent low-wage workers from accepting wage cuts to finance training (Rosen, 1972).

The impact of statutory minimum wages on measured average productivity was estimated based on the assumption that changes in minimum wages have a greater impact on productivity in industries that are more heavily reliant on low-wage labour. In order to reduce bias due to the possible relationship between minimum wages and the distribution of low-wage employment, low-wage industries are identified based on the incidence of low-wage workers by industry in the United Kingdom prior to the introduction of statutory minimum wages in that country in 1999.[6] Minimum wages are measured as the economy-wide ratio of the gross statutory minimum wage to the median wage. Chart 3 shows that an increase of ten percentage points in the ratio of the statutory minimum wage to the median wage (approximately equal to the cross-country standard deviation in minimum wages) is associated with an increase of between 1.7 and 2.0 percentage points in the long-run level of both measured labour productivity and MFP.

It is not clear, however, to what extent the positive impact of minimum wages on productivity is simply due to substitution of skilled for

6 It is possible that the distribution of low-wage workers in the United Kingdom prior to the introduction of the minimum wage reflected economic conditions of the time period examined, rather than an underlying propensity for employing low-wage workers. However, the baseline results appear to be relatively robust to the use of alternative indicators based on the average distribution of low-wage workers by industry across a number of European countries (Bassanini and Venn, 2007).

unskilled workers, increasing the aggregate level of skills and productivity, rather than as the result of improved incentives to invest in training. Competing explanations – that is, training vs. skilled/unskilled substitution effects – have very different policy implications. In fact, while the training story would imply a virtuous link, the substitution story would suggest that the positive productivity effect is purely a statistical artefact and point to undesirable distributional consequences of excessive minimum wages. Although our specification provides no conclusive way of disentangling these effects, further analysis with alternative specifications suggests that minimum wages have a more significant impact on the level of productivity than its growth rate. Insofar as the training channel would likely affect the growth rate as well as the level of productivity, this result provides some, albeit weak, evidence that substitution of high- for low-skilled workers is effectively part of the story. Therefore, the possibility that a large proportion of the productivity effect of minimum wages is due to reduced demand for unskilled workers should be kept in mind when drawing policy implications from these results.

The effect of minimum wages on productivity reported in Chart 3 is estimated assuming that factors other than minimum wages have the same impact on productivity in both low-wage and other industries. Previous research (e.g. Bassanini and Duval, 2006) shows that minimum wages can influence the way in which the tax wedge affects unemployment. The explanation for this may be that higher minimum wages make it more difficult for employers to pass on tax increases to workers, reducing demand for labour. If minimum wages intensify the negative effect of taxes on employment, the lower employment rates that result could induce higher levels of productivity through a composition effect. In this way, the estimated positive impact of minimum wages on productivity could simply be a result of their amplifying the effect of taxes on employment. However, further analysis shows that controlling for an interaction between the tax wedge and the minimum wage had little impact on the baseline results, indicating that minimum wages have an effect on productivity that is independent of any interaction with taxes.

We also find some evidence that generous unemployment benefits may reduce the positive impact of minimum wages on productivity in low-wage industries. The higher the minimum wage relative to the unemployment benefit replacement rate, the greater the opportunity cost of remaining unemployed. If minimum wages increase productivity by reducing demand for unskilled labour and providing incentives for unskilled workers to invest in training to avoid unemployment, high replacement rates could dull this effect by reducing the opportunity cost of remaining unemployed.[7]

Parental Leave

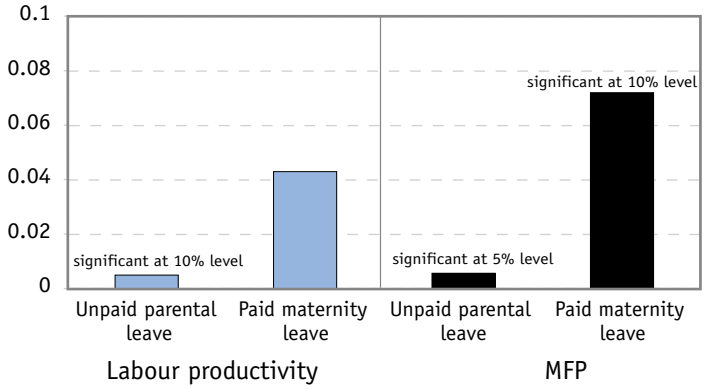
Family-friendly policies, such as parental leave, may help improve parents' morale and work commitment, having a positive impact on productivity by making it easier for parents to balance paid work with family responsibilities. In the absence of family-friendly working arrangements, working parents, particularly women, might leave the workforce completely for extended periods of time, reducing their total work experience and accumulated job-spe-

7 Alternatively, this result could indicate that in low-wage industries, higher minimum wages reduce the positive impact of unemployment benefits on productivity (see the next sections for a full discussion of the possible effects of unemployment benefits on productivity). In short, if unemployment benefits increase productivity by giving the unemployed a buffer of time or resources to find a well-matched job, higher minimum wages will dampen this effect by increasing the opportunity cost for unskilled workers of remaining unemployed and creating an incentive for the unemployed to move quickly into any available job vacancy.

Chart 4

Impact of Parental Leave on Productivity

Percentage-point impact on labour productivity and MFP levels of a one-week increase in unpaid parental leave or paid maternity leave from the sample means[a]



Note: Derived from difference-in-differences OLS estimates. The estimates in this chart are calculated by multiplying the estimated effect of parental leave in female-dominated industries by the share of female-dominated industries in total GDP. This assumes that there is zero impact of parental leave in other industries (and in all industries that are not included in the sample used in the analysis). Therefore, the estimates represent a lower bound of the aggregate impact of parental leave on productivity levels. See Bassanini and Venn (2007) for full methodology and results.

a) The sample means are 64 weeks of unpaid parental leave and 15 weeks of paid maternity leave.

cific human capital. Firms and workers who are assured of an ongoing employment relationship might also be more likely to invest in training. Alternatively, parental leave could impede productivity by reducing parents' access to training and leading to human capital depreciation. Policies that increase the cost to employers of employing parents could lead to discriminatory and inefficient hiring outcomes, whereby highly-skilled women are concentrated in low-skilled jobs. In addition, if new workers lacking in job-specific skills are hired to replace employees taking parental leave, productivity could fall, at least temporarily.

There is very little existing empirical evidence on the direct productivity impact of parental leave. Gray (2002) finds that the provision of paid parental leave has no significant impact on manager-reported measures of labour productivity, financial performance, turnover or absenteeism. To the extent that higher productivity is reflected in higher wages, the literature examining the impact of parental leave on wages provides more evidence on the expected relationship between parental leave and productivity. Time spent out of the workforce after childbirth can have a negative impact on subsequent wages for women due to human capital depreciation or loss of opportunities to accumulate human capital while away from work (Datta Gupta and Smith, 2002). However, a number of studies have shown that the availability and use of parental leave mitigates the negative effects of children on women's wages by increasing the speed at which women return to work following childbirth (Ronsen and Sundstrom, 1996; Berger and Waldfogel, 2004; Dex *et al.*, 1998; Burgess *et al.*, 2008; Joshi *et al.*, 1999) and increasing the likelihood that women return to their pre-birth job, allowing them to capitalise on the benefits of accumulated tenure with their existing employer, such as seniority, training and access to internal labour markets (Baker and Milligan, 2005; Waldfogel 1998; Waldfogel *et al.*, 1999). However, the positive impact of parental leave on productivity may occur only for relatively short periods of leave, whereas long periods of leave lead to substantial depreciation of human capital, even if women eventually return to their pre-birth job (Ruhm, 1998).

We estimate the impact of parental leave on productivity by assuming that the availability of parental leave has a greater impact on productivity in industries where employment is female-dominated. Two variables for parental leave are used in this analysis: total weeks of legislated unpaid parental leave, including child-care leave; and total weeks of legislated paid maternity leave, estimated at average manufacturing worker wages. Chart 4 shows that longer unpaid parental leave is associated with somewhat higher productivity levels. Assuming that there is no impact of unpaid parental leave

on productivity in non-female-dominated industries, a one-week increase in the length of available leave is associated with an increase in the level of aggregate labour productivity and MFP of at least 0.005 percentage points. The results for paid maternity leave are more ambiguous: longer periods of available paid maternity leave are associated with higher productivity levels, but the effects are only statistically significant for MFP. Nevertheless, the estimates suggest that the productivity effect of additional paid maternity leave is larger than that for unpaid parental leave.[8]

These results suggest that if countries with no paid maternity leave (such as the United States) introduced this measure at the average OECD level (15 weeks), they could increase their MFP by about 1.1% in the long-run. Further analysis suggests that the impact of additional weeks of leave on productivity is greater in countries with relatively short periods of leave than in countries that already have generous leave entitlements. Increases in the length of unpaid parental leave only appear to be associated with higher productivity in countries where paid maternity leave is short or non-existent. In countries where women already have access to ten weeks or more of paid maternity leave, changes in unpaid parental leave have no significant impact on productivity. It is possible that at least part of the observed impact of parental leave on productivity is due to changes in the level of employment rather than changes in individual productivity. For example, firms could reduce total employment if they think additional parental leave will impose costs on hiring workers, leading to higher productivity through composition effects. Over the longer term, firms might substitute capital for labour in order to reduce the potential cost of parental leave, increasing the capital-to-labour ratio and raising labour productivity. We estimate that employment and composition effects could explain up to half of the productivity effect of paid maternity leave (and a smaller proportion for unpaid parental leave), although this result varies substantially between countries.

Unemployment Benefits

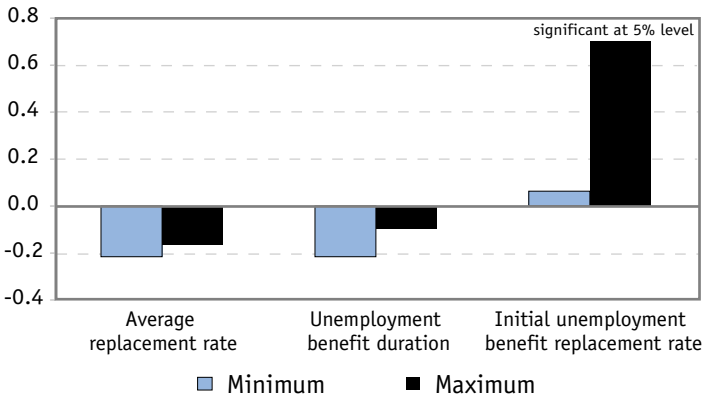
There are a number of channels through which unemployment benefits could affect productivity. First, generous unemployment benefits tend to price low-productivity workers out of jobs in imperfect labour markets (Lagos, 2006), increasing the proportion of high-skilled workers employed and therefore the average productivity level of the workforce. Second, generous unemployment benefits (in terms of either duration, replacement rate or both) may provide a buffer of time and resources to allow the unemployed to find a job that suits their skills and experience, resulting in higher quality, longer-lasting matches between the unemployed and available job vacancies (Marimon and Zilibotti, 1999), increasing productivity by improving the efficiency of resource allocation and increasing incentives for firms and workers to invest in training. Furthermore, it is possible that the provision of generous unemployment benefits encourages the creation of high-risk, high-productivity jobs by making the unemployed more inclined to accept job contracts with a high risk of being terminated quickly (Acemoglu and Shimer, 1999, 2000). Unemployment benefits may also have some adverse effects on productivity. It is well established that generous unemployment benefits can increase the duration of unemployment spells and the level of unemployment (see OECD, 2006, for a survey of recent literature), resulting in lower

8 The statistical significance of the results for both unpaid parental leave and paid maternity leave is somewhat sensitive to changes in the sample of countries included in the analysis, but the point estimates are always positive, indicating that parental leave has either no impact or a positive impact on productivity. There is no evidence that parental leave has a negative impact on productivity.

Chart 5

Impact of Unemployment Benefits on GDP per capita

Percentage-point impact on the steady-state level of GDP per capita of a 10 per cent increase in average replacement rate, unemployment benefit duration and initial benefit replacement rate



Note: Derived from pooled mean group estimates. For each policy, minimum and maximum indicate the smallest and greatest estimate obtained in the specifications reported in OECD (2007a).

productivity through human capital depreciation and inefficient resource use. In addition, by reducing the opportunity cost of unemployment, generous unemployment benefits may lead existing employees to reduce their work effort, thereby lowering productivity (Shapiro and Stiglitz, 1984; Albrecht and Vroman, 1996).

However, it is difficult to pinpoint the industries where unemployment benefits are more binding. Therefore, the difference-in-difference methodology we used for other policies does not have a straightforward application. In contrast with EPL, minimum wages and parental leave, however, there are long and reliable time series on unemployment benefit generosity so we can estimate the direct impact of unemployment benefits on GDP per capita using a structural growth model. Since more generous unemployment benefits are associated with lower aggregate employment rates, the overall effect of higher unemployment benefits on GDP per capita will be negative unless a positive productivity effect compensates fully for the negative employment effect. We can therefore obtain some evidence on the impact of unemployment benefits on productivity from the direct estimation of their overall effect on GDP per capita.

Chart 5 shows that the generosity of unemployment benefits (as measured by an average of gross replacement rates across various earnings levels, family situations and durations of unemployment) appears to have no statistically significant impact, in the long-run, on the level of GDP per capita.[9] These results suggest that any negative impact of unemployment benefits on employment is offset fully by a net positive impact of unemployment benefits on average measured productivity. Furthermore, although point estimates are negative, the long-run elasticity of GDP per capita to changes in benefit generosity appears to be much smaller than the corresponding elasticity of the employment rate.[10] This cautiously suggests that an increase in the generosity of unemployment benefits is likely to have a positive effect on productivity over and above composition effects.

Both of the channels through which unemployment benefits can potentially have a positive influence on productivity over and above composition effects – by improving job-match quality and by encouraging the creation of high-productivity, high-risk jobs – seem to receive

9 These estimates are obtained by fitting the augmented Solow growth model described in Bassanini and Venn (2007), which was made possible by the availability of long time series for average gross replacement rates. The sample covers 18 OECD countries over the period 1970-2002. The countries included in the sample are Australia, Austria, Belgium, Canada, Denmark, France, Greece, Ireland, Italy, Japan, the Netherlands, Norway, New Zealand, Portugal, Spain, Switzerland, the United Kingdom and the United States. Canadian data on gross replacement rates refer only to the Province of Ontario. Yet, eliminating Canada from the sample yields an even less negative point-estimate, thus reinforcing the results.

10 As shown in Chart 5, at the sample average, a 10 per cent increase in average replacement rates would imply a fall in GDP per capita of about 0.15-0.2 per cent, implying an elasticity no greater than -0.02. Such a low elasticity cannot be entirely explained through composition effects.

some support from the empirical evidence. Generous unemployment benefits appear to be associated with higher quality job matches, although the effects are relatively small (e.g. Pollmann-Schult and Buchel; 2005; Centeno, 2004; Belzil, 2001; Addison and Blackburn, 2000; Polachek and Xiang, 2005). Evidence on the relationship between unemployment benefits and the creation of high-productivity/high-risk jobs is less clear, but suggests that more generous unemployment benefits increase the supply of high-wage jobs (Acemoglu, 1997). Further evidence presented in Bassanini and Venn (2007) shows a positive effect of unemployment benefits on relative levels of MFP and labour productivity in high-risk industries compared to low-risk industries.

Overall, the net impact of unemployment benefits on average measured productivity appears to be positive. How much of this positive effect is due to changes in the composition of the labour force as a result of the impact of unemployment benefits on employment remains unclear. Unemployment benefits seem to have some independent positive impact on productivity, by supporting higher quality job matches and facilitating the creation of riskier, higher productivity jobs by providing insurance against future job loss. Yet, the net impact on GDP per capita appears to be small.

Conclusion

The results presented in this article show that labour market policies can have a significant impact on productivity levels and/or growth rates, over and above their impact on employment. Stringent EPL has a small negative impact on long-run productivity growth, most likely by restricting the movement of labour into emerging, high-productivity activities, firms or industries. Increases in the ratio of the minimum wage to the median wage appear to have a positive impact on the aggregate level of measured productivity. The effect may be due to improved incentives for investing in training or come as the result of substitution of skilled labour for unskilled labour. The relative importance of the two interpretations is key for policy purposes, but could not be determined empirically. Additional parental leave appears to increase the level of productivity, in part by allowing workers with family responsibilities to maintain their links to the workforce, although the magnitude of the effect is small and not always statistically significant. Finally, reforms that reduce the generosity of unemployment benefits are likely to reduce the aggregate level of measured productivity by limiting the time and resources available to the unemployed to find a well-matched job vacancy, discouraging workers from taking up – and firms from creating – high-risk, high-productivity jobs and affecting the skill composition of the workforce. However, the overall long-run impact of lowering unemployment benefits on the level of GDP per capita appears to be negligible.

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